at least one strippable conductive film. The thin film to be patterned is then patterned by dry etching using the mask. Finally, the at least one strippable conductive film is removed.

Through the method of the claimed invention forming at least one strippable conductive film on a surface of a thin film to be patterned, forming a mask on the at least one strippable conductive film and removing the strippable conductive file after dry etching, as claimed in claims 1, 8 and 9, the claimed invention provides a method of patterning a thin film which can prevent damage due to electrostatic charge. The prior art does not show, teach or suggest the invention as claimed in claims 1, 8 and 9.

Claim 10 claims a method of patterning a thin film, claim 14 claims a method of manufacturing a thin-film device using a thin-film patterning method and claim 15 claims a method of manufacturing a thin-film magnetic head using a thin-film patterning method. The method of patterning the thin film comprises the steps of: first, forming at least an insulating organic film and a conductive film on a surface on which a resist pattern is to be formed. Next, a resist pattern is formed on the conductive film. Finally, the resist film is patterned using an electron beam writing method.

Through the method of the claimed invention forming at least an insulating organic film and a conductive film on a surface on which a resist pattern is to be formed and then forming a resist film on the conductive film, as claimed in claims 10, 14 and 15, the claimed invention provides a method of patterning a thin film which can prevent damage due to electrostatic charge. The prior art does not show, teach or suggest the invention as claimed in claims 10, 14 and 15.

Claim 16 claims a method of patterning a thin film, claim 20 claims a method of manufacturing a thin-film device using a thin-film patterning method and claim 21 claims a method of manufacturing a thin-film magnetic head using a thin-film patterning method. The thin-film patterning method comprises the steps of: first, forming at least an insulating organic film and a conductive film on a surface of a thin film to be patterned. Next, a resist film is formed on the conductive film. The resist film is then patterned using an electron beam writing method. The thin film is then patterned by dry etching using the patterned resist film as a mask. Finally, the at least insulating organic film and conductive film are removed.

Through the method of claimed invention forming at least an insulating organic film and a conductive film on a surface of a thin film to be patterned, forming a resist film on the conductive film and removing the insulating organic film and conductive film after dry etching, as claimed in claims 16, 20 and 21, the claimed invention provides a thin film patterning method which prevents damage due to electrostatic charge. The prior art does not show, teach or suggest the invention as claimed in claims 16, 20 and 21.

Claims 1-21 were rejected under 35 U.S.C. §103 as being unpatentable over *Okamoto* (U.S. Patent No. 5,641,715) in view of *Soga et al* (U.S. Patent No. 5,028,938).

Applicant respectfully traverses the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for reasons which will be set forth below, it is respectfully requested that the Examiner withdraws the rejection to the claims and allows the claims to issue.

Okamoto appears to disclose an exposure process for forming a desired IC pattern on a semiconductor wafer among those of a recent method of fabricating a semiconductor IC circuit device employs an exposure technique using an electron beam instead of ultraviolet rays. An electron beam direct writing system, which writes IC pattern directly on a semiconductor wafer coated with an electron beam resist film with an electron beam, has attracted a great deal of attention because of its capability of forming a minute IC pattern on a semiconductor wafer superior to that of the conventional optical exposure system which transfers an IC pattern formed on a photomask on a semiconductor wafer. (col. 1, lines 10-21) In Figs. 5a-5b, a metal film 24 is deposited over a major surface of a semiconductor wafer 2 in which a predetermined IC is formed, and a chemical amplification negative electron beam resist film 25 is formed over the metal film 24 by coating. (col. 15, lines 48-52) A conductive polymer film 22 is formed over the negative electron beam resist film 25 by coating to prevent the charging-up of the semiconductor wafer 2 during exposure, and to suppress the aging of the negative electron beam resist film 25 after exposure and to stabilize the negative electron beam resist film 25. (col. 15, lines 61-66) Then, the semiconductor wafer 2 is positioned on the xy-stage 15 of the electron beam exposure apparatus 1 shown in FIG. 2, and the surface of the semiconductor wafer 2 is irradiated with the electron beam 7 according to writing data representing a portion inside the actual pattern of wiring lines stored in the data storage device 3a of the data storage unit 3. When irradiated with the electron beam 7, the acid producing agent contained in the negative electron beam resist film 25 is hydrolyzed and produces an acid. Then, the negative electron beam resist film 25 is baked to enhance the solubility of

unirradiated portions of the negative electron beam resist film 25, the semiconductor wafer 2 is washed to remove the conductive polymer film 22, and then the negative electron beam resist film 25 is developed using an organic solvent to form a resist pattern. (col. 16, lines 5-19) Then, the metal film 24 is etched using the resist pattern as a mask to form wiring lines 24A, and then the negative electron beam resist film 25 is removed from the surface of the semiconductor wafer 2. Since this semiconductor IC device fabricating method uses the positive electron beam resist film 21 and the negative electron beam resist film 25 selectively for the process of forming the contact holes 23 and the process of forming the wiring lines 24A, writing time necessary for writing with the electron beam can be reduced. (col. 16, lines 28-37)

Thus, *Okamoto* merely discloses forming a resist film 25 over a metal film 24 and then forming a conductive polymer film 22 over the resist film 25. Nothing in *Okamoto* shows, teaches or suggests forming a strippable conductive film on a surface of a thin film to be patterned as claimed in claims 1, 8 and 9. Rather, *Okamoto* merely discloses a resist film 25 formed over the metal film 24 (i.e., the resist film 25 is not a strippable conductive film).

Additionally, *Okamoto* merely discloses that a conductive polymer film 22 is formed over the resist film 25 which is then irradiated with an electron beam 7. Thus nothing in *Okamoto* shows, teaches or suggests forming a mask on the strippable conductive film as claimed in claims 1, 8 and 9. Rather, *Okamoto* merely discloses a conductive polymer film 22 is formed over the resist film 25 and is irradiated with an electron beam 7 (i.e., the conductive polymer film 22 is not a mask).

Also, *Okamoto* merely discloses that the conductive polymer film 22 is removed prior to developing the resist film 25 and that the developed resist film 25 forms a resist pattern which is used as a mask to etch the metal film 24. Thus nothing in *Okamoto* shows, teaches or suggests removing the strippable conductive film after patterning the thin film as claimed in claims 1, 8 and 9. Rather, *Okamoto* teaches away from the claimed invention since the conductive polymer film 22 is removed prior to developing the resist film 25 into a resist pattern which is used as a mask to etch the metal film 24 (i.e. film 22 is removed prior to patterning metal film 24).

Furthermore, as discussed above, *Okamoto* merely discloses a resist film 25 formed on a metal film 24. Nothing in *Okamoto* shows, teaches or suggests forming an insulating organic film and a conductive film on a surface on which a resist pattern is to be formed, as claimed in claims 10, 14 and 15. Rather, *Okamoto* merely discloses forming a resist film 25 on a metal film 24.

Applicant respectfully traverses the Examiner's statement that it would be obvious to modify *Okamoto* to utilize both a conductive and an insulating layer as a first film. Nowhere in *Okamoto* is it shown, taught or suggested forming an insulating organic film and a conductive film as claimed in claims 10, 14 and 15.

Additionally, as discussed above, the resist film 25 is formed on the metal film 24 in *Okamoto*. Therefore, nothing in *Okamoto* shows, teaches or suggests forming a resist film on the conductive film as claimed in claims 10, 14 and 15. Rather, *Okamoto* merely discloses that the resist film is formed on the metal film 24 which is to be patterned.

Also, *Okamoto* clearly discloses that the resist film 25 is developed after the conductive polymer film 22 is irradiated with an electron beam 7 and the resist film is developed. Thus nothing in *Okamoto* shows, teaches or suggests patterning the resist film using an electron beam writing method as claimed in claims 10, 14 and 15.

Additionally, as discussed above, *Okamoto* merely discloses forming the resist film 25 on the metal film 24. Thus nothing in *Okamoto* shows, teaches or suggests forming at least an insulating organic film and a conductive film on a surface of a thin film to be patterned as claimed in claims 16, 20 and 21. Rather, *Okamoto* merely discloses that the resist film 25 is formed on the metal film 24.

Applicants respectfully traverse the Examiner's statement it would be obvious to modify *Okamoto* to utilize both a conductive and an insulating layer as a first film. Nowhere in *Okamoto* is it shown, taught or suggested to form an insulating organic film and a conductive film on a surface of a thin film as claimed in claims 16, 20 and 21.

Additionally, *Okamoto* merely discloses a conductive polymer film 22 formed over the resist film 25. Thus nothing in *Okamoto* shows, teaches or suggests forming a resist film on the conductive film. In fact *Okamoto* teaches away from the claimed invention since the conductive film 22 in *Okamoto* is formed on the resist film 25.

Finally, *Okamoto* merely discloses removing the conductive polymer film 22 prior to developing the resist film 25 to form the resist pattern which is used as a mask to etch the metal film 24. However, as claimed in claims 16, 20 and 21, the insulating organic film and conductive film are removed after the thin film is patterned by dry etching.

However, *Okamoto* teaches away from the claimed invention since the conductive polymer film 22 is removed prior to etching the metal film 24.

Soga et al appears to disclose to form the printing electrodes in a strip format, a film of an electrically conductive layer may be patterned by combining lithography--based on ordinary light, laser beam, or electron beam--with either wet or dry etching. The printing electrodes may otherwise be made by subjecting the electrically conductive layer to a direct printing.

Thus, *Soga et al* merely discloses using wet or dry etching to pattern printing electrodes. Nothing in *Soga et al* shows, teaches or suggests any of the other features as claimed in claims 1, 8, 9, 10, 14-16, 20 and 21. Rather, *Soga et al* merely discloses wet or dry etching.

The combination of *Okamoto* and *Soga et al* would merely suggest that the etching of the metal film using the resist pattern 25 of *Okamoto* can be done with either wet or dry etching as taught by *Soga et al*. Thus nothing in the combination of *Okamoto* or *Soga et al* shows, teaches or suggests the various features as discussed above with regard to claims 1, 8-10, 14-16, 20 and 21. Therefore, it is respectfully requested that the Examiner withdraws the rejection to claims 1, 8-10, 14-16, 20 and 21 under 35 U.S.C. §103.

Claims 2-7, 11-13, 17-19 depend from claims 1, 10 and 16 and recite additional features. It is respectfully submitted that claims 2-7, 11-13, 17-19 would not have been obvious within the meaning of 35 U.S.C. §103 over *Okamoto* and *Soga et al* at least for the reasons as set forth above. Therefore, it is respectfully requested that the Examiner withdraws the rejection to claims 2-7, 11-13 and 17-19 under 35 U.S.C. §103.

The prior art of record, which is not relied upon, is acknowledged. The references taken singularly or in combination do not anticipate or make obvious the claimed invention.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, applicant respectfully petitions for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

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Date: March 12, 2003